SEQUENCE LISTING

<110> Japan Science and Technology Agency

<120> The functional domain and its associated molecule of DOCK2 which is essential for lymphocyte migration

<130> A031-44PCT

<140>

<141>

<150> JP P2002-342683

<151> 2002-11-26

<160> 7

<170> PatentIn Ver. 2.1

<210> 1

<211> 1828

<212> PRT

<213> Mus musculus

<400> 1

Met Ala Pro Trp Arg Lys Thr Asp Lys Glu Arg His Gly Val Ala Ile
1   5   10   15

Tyr Asn Phe Gln Gly Ser Glu Ala Gln His Leu Thr Leu Gln Ile Gly
            20   25   30

Asp Val Val Arg Ile Gln Glu Thr Cys Gly Asp Trp Tyr Arg Gly Tyr
            35   40   45

Leu Ile Lys His Lys Leu Ser Gln Gly Ile Phe Pro Thr Ser Phe Ile
            50   55   60

His Leu Lys Glu Val Thr Val Glu Lys Arg Arg Asn Ile Glu Asn Ile
65   70   75   80

Ile Pro Ala Glu Ile Pro Leu Ala Gln Glu Val Thr Thr Thr Leu Trp
                85   90   95

Glu Trp Gly Ser Ile Trp Lys Gln Leu Tyr Val Ala Ser Lys Lys Glu
            100   105   110

Arg Phe Leu Gln Val Gln Ser Met Met Tyr Asp Leu Met Glu Trp Arg
            115   120   125

Ser Gln Leu Leu Ser Gly Thr Leu Pro Lys Asp Glu Leu Lys Glu Leu
            130   135   140

Lys Gln Lys Val Thr Ser Lys Ile Asp Tyr Gly Asn Lys Ile Leu Glu
145   150   155   160

2／6 1

Leu Asp Leu Ile Val Arg Asp Glu Asp Gly Asn Ile Leu Asp Pro Asp
165   170   175

Lys Thr Ser Val Ile Ser Leu Phe His Ala His Glu Glu Ala Thr Tyr
180   185   190

Lys Ile Thr Glu Arg Ile Lys Glu Glu Met Ser Lys Asp Gln Pro Asp
195   200   205

Tyr Gly Val Tyr Ser Arg Ile Ser Ser Ser Pro Thr His Ser Leu Tyr
210   215   220

Val Phe Val Arg Asn Phe Val Cys Arg Ile Gly Glu Asp Ala Glu Leu
225   230   235   240

Phe Met Ser Leu Tyr Asp Pro His Lys Gln Thr Val Ile Ser Glu Asn
245   250   255

Tyr Leu Val Arg Trp Gly Ser Lys Gly Phe Pro Lys Glu Ile Glu Met
260   265   270

Leu Asn Asn Leu Lys Val Val Phe Thr Asp Leu Gly Asn Lys Asp Leu
275   280   285

Asn Arg Asp Lys Ile Phe Leu Ile Cys Gln Ile Val Arg Ile Gly Lys
290   295   300

Met Asp Leu Lys Asp Ile Asn Ala Lys Lys Cys Thr Gln Gly Leu Arg
305   310   315   320

Arg Pro Phe Gly Val Ala Val Met Asp Ile Thr Asp Ile Ile Lys Gly
            325   330   335

Lys Ala Glu Ser Asp Glu Glu Lys Gln His Phe Ile Pro Phe His Pro
            340   345   350

Val Ser Ala Glu Asn Asp Phe Leu His Ser Leu Leu Gly Lys Val Ile
            355   360   365

Ala Ser Lys Gly Asp Ser Gly Gly Gln Gly Leu Trp Val Thr Met Lys
            370   375   380

Met Leu Val Gly Asp Ile Ile Gln Ile Arg Lys Asp Tyr Pro His Leu
385   390   395   400

Val Asp Arg Thr Thr Val Val Ala Arg Lys Leu Gly Phe Pro Glu Ile
            405   410   415

Ile Met Pro Gly Asp Val Arg Asn Asp Ile Tyr Ile Thr Leu Leu Gln
            420   425   430

Gly Asp Phe Asp Lys Tyr Thr Lys Thr Thr Gln Arg Asn Val Glu Val
            435   440   445

Ile Met Cys Val Cys Thr Glu Asp Gly Lys Val Leu Pro Asn Ala Ile
    450   455   460

Cys Val Gly Ala Gly Asp Lys Ala Met Asn Glu Tyr His Ser Val Val
465   470   475   480

Tyr Tyr Gln Val Lys Gln Pro Arg Trp Met Glu Thr Val Lys Val Ala
            485   490   495

Val Pro Ile Glu Asp Met Gln Arg Ile His Leu Arg Phe Met Phe Arg
        500   505   510

His Arg Ser Ser Leu Glu Ser Lys Asp Lys Gly Glu Lys Asn Phe Ala
        515   520   525

Met Ser Tyr Val Lys Leu Met Lys Glu Asp Gly Thr Thr Leu His Asp
    530   535   540

Gly Tyr His Glu Leu Val Val Leu Lys Gly Asp Ser Lys Lys Met Glu
545   550   555   560

Asp Ala Ser Ala Tyr Leu Thr Leu Pro Ser Tyr Arg His Pro Val Glu
            565   570   575

Asn Lys Gly Ala Thr Leu Ser Arg Ser Ser Ser Ser Val Gly Gly Leu
        580   585   590

Ser Val Ser Ser Arg Asp Val Phe Ser Ile Ser Thr Leu Val Cys Ser
        595   600   605

Thr Lys Leu Thr Gln Asn Val Gly Leu Leu Gly Leu Leu Lys Trp Arg
        610   615   620

Met Lys Pro Gln Leu Leu Gln Glu Asn Leu Glu Lys Leu Lys Ile Val
625   630   635   640

Asp Gly Glu Glu Val Val Lys Phe Leu Gln Asp Thr Leu Asp Ala Leu
                645   650   655

Phe Asn Ile Met Met Glu His Ser Gln Ser Asn Glu Tyr Asp Ile Leu
                660   665   670

Val Phe Asp Ala Leu Ile Tyr Ile Ile Gly Leu Ile Ala Asp Arg Lys
        675   680   685

Phe Gln His Phe Asn Thr Val Leu Glu Ala Tyr Ile Gln Gln His Phe
        690   695   700

Ser Ala Thr Leu Ala Tyr Lys Lys Leu Met Thr Val Leu Lys Thr Tyr
705   710   715   720

Leu Asp Thr Ser Ser Arg Gly Glu Gln Cys Glu Pro Ile Leu Arg Thr
                725   730   735

Leu Lys Ala Leu Glu Tyr Val Phe Lys Phe Ile Val Arg Ser Arg Thr
         740   745   750

Leu Phe Ser Gln Leu Tyr Glu Gly Lys Glu Gln Met Glu Phe Glu Glu
         755   760   765

Ser Met Arg Arg Leu Phe Glu Ser Ile Asn Asn Leu Met Lys Ser Gln
         770   775   780

Tyr Lys Thr Thr Ile Leu Leu Gln Val Ala Ala Leu Lys Tyr Ile Pro
785   790   795   800

Ser Val Leu His Asp Val Glu Thr Val Phe Asp Ala Lys Leu Leu Ser
            805   810   815

Gln Leu Leu Tyr Glu Phe Tyr Thr Cys Ile Pro Pro Val Lys Leu Gln
         820   825   830

Lys Gln Lys Val Gln Ser Met Asn Glu Ile Val Gln Ser Asn Leu Phe
         835   840   845

Lys Lys Gln Glu Cys Arg Asp Ile Leu Leu Pro Val Ile Thr Lys Glu
         850   855   860

Leu Lys Glu Leu Leu Glu Gln Arg Asp Asp Gly Gln His Gln Ala Glu
865   870   875   880

Lys Lys His Cys Val Glu Leu Leu Asn Ser Ile Leu Glu Val Leu Ser
          885   890   895

Cys Gln Asp Ala Ala Phe Thr Tyr Asp His Ile Gln Glu Ile Met Val
          900   905   910

Gln Leu Leu Arg Thr Val Asn Arg Thr Val Ile Thr Met Gly Arg Asp
          915   920   925

His Ala Leu Ile Ser His Phe Glu Ala Cys Met Thr Ala Ile Leu Asp
          930   935   940

Gln Met Gly Asp Gln His Tyr Ser Phe Tyr Ile Glu Thr Phe Gln Thr
945   950   955   960

Ser Ser Asp Leu Val Asp Phe Leu Met Glu Thr Phe Ile Met Phe Lys
          965   970   975

Asp Leu Ile Gly Lys Asn Val Tyr Pro Gly Asp Trp Met Ala Met Ser
          980   985   990

Met Val Gln Asn Arg Val Phe Leu Arg Ala Ile Asn Lys Phe Ala Glu
          995   1000   1005

Thr Met Asn Gln Lys Phe Leu Glu His Thr Ser Phe Glu Phe Gln Leu
          1010   1015   1020

Trp Asn Asn Tyr Phe His Leu Ala Val Ala Phe Ile Thr Gln Asp Ser
1025   1030   1035   1040

Leu Gln Leu Glu Gln Phe Thr His Ala Lys Tyr Asn Lys Ile Leu Asn
          1045   1050   1055

Lys Tyr Gly Asp Met Arg Arg Leu Ile Gly Phe Ser Ile Arg Asp Met
          1060   1065   1070

Trp Tyr Lys Leu Gly Gln Asn Lys Ile Cys Phe Ile Pro Gly Met Val
        1075   1080   1085

Gly Pro Ile Leu Glu Met Thr Leu Ile Pro Glu Ala Glu Leu Arg Lys
        1090   1095   1100

Ala Thr Ile Pro Ile Phe Phe Asp Met Met Leu Cys Glu Tyr Gln Arg
1105   1110   1115   1120

Thr Gly Ala Phe Lys Lys Phe Glu Asn Glu Ile Ile Leu Lys Leu Asp
          1125   1130   1135

His Glu Val Glu Gly Gly Arg Gly Asp Glu Gln Tyr Met Gln Leu Leu
          1140   1145   1150

Glu Ser Ile Leu Met Glu Cys Thr Ala Glu His Pro Thr Ile Ala Lys
        1155   1160   1165

Ser Val Glu Asn Phe Val Ser Leu Val Lys Gly Leu Leu Glu Lys Leu
　　1170　　　　　　　　1175　　　　　　　　1180

Leu Asp Tyr Arg Gly Val Met Thr Asp Glu Ser Lys Asp Asn Arg Met
1185　　　　　　　　1190　　　　　　　　1195　　　　　　　　1200

Ser Cys Thr Val Asn Leu Leu Asn Phe Tyr Lys Asp Asn Asn Arg Glu
　　　　1205　　　　　　　　1210　　　　　　　　1215

Glu Met Tyr Ile Arg Tyr Leu Tyr Lys Leu Arg Asp Leu His Leu Asp
　　　　1220　　　　　　　　1225　　　　　　　　1230

Cys Glu Asn Tyr Thr Glu Ala Ala Tyr Thr Leu Leu Leu His Thr Trp
　　1235　　　　　　　　1240　　　　　　　　1245

Leu Leu Lys Trp Ser Asp Glu Gln Cys Ala Ser Gln Val Met Gln Thr
　　1250　　　　　　　　1255　　　　　　　1260

Gly Gln Gln His Pro Gln Thr His Arg Gln Leu Lys Glu Thr Leu Tyr
1265　　　　　　　　1270　　　　　　　　1275　　　　　　　　1280

Glu Thr Ile Ile Gly Tyr Phe Asp Lys Gly Lys Met Trp Glu Glu Ala
　　　　1285　　　　　　　　1290　　　　　　　　1295

Ile Ser Leu Cys Lys Glu Leu Ala Glu Gln Tyr Glu Met Glu Ile Phe
　　1300　　　　　　　　1305　　　　　　　　1310

Asp Tyr Glu Leu Leu Ser Gln Asn Leu Thr Gln Gln Ala Lys Phe Tyr
    1315   1320   1325

Glu Asn Ile Met Lys Ile Leu Arg Thr Lys Pro Asp Tyr Phe Ala Val
    1330   1335   1340

Gly Tyr Tyr Gly Gln Gly Phe Pro Ser Phe Leu Arg Asn Lys Val Phe
1345   1350   1355   1360

Ile Tyr Arg Gly Lys Glu Tyr Glu Arg Arg Glu Asp Phe Gln Met Gln
            1365   1370   1375

Leu Leu Ser Gln Phe Pro Asn Ala Glu Lys Met Asn Thr Thr Ser Ala
            1380   1385   1390

Pro Gly Asp Asp Val Arg Asn Ala Pro Gly Gln Tyr Ile Gln Cys Phe
    1395   1400   1405

Thr Val Gln Pro Val Leu Asp Glu His Pro Arg Phe Lys Asn Lys Pro
    1410   1415   1420

Val Pro Asp Gln Ile Ile Asn Phe Tyr Lys Ser Asn Tyr Val Gln Lys
1425   1430   1435   1440

Phe His Tyr Ser Arg Pro Val Arg Arg Gly Lys Val Asp Pro Glu Asn
            1445   1450   1455

Glu Phe Ala Ser Met Trp Ile Glu Arg Thr Ser Phe Leu Thr Ala Tyr
            1460   1465   1470

Lys Leu Pro Gly Ile Leu Arg Trp Phe Glu Val Val His Met Ser Gln
            1475   1480   1485

Thr Thr Ile Ser Pro Leu Glu Asn Ala Ile Glu Thr Met Ser Thr Val
            1490   1495   1500

Asn Glu Lys Ile Leu Met Met Ile Asn Gln Tyr Gln Ser Asp Glu Ser
1505   1510   1515   1520

Leu Pro Ile Asn Pro Leu Ser Met Leu Leu Asn Gly Ile Val Asp Pro
            1525   1530   1535

Ala Val Met Gly Gly Phe Ala Lys Tyr Glu Lys Ala Phe Phe Thr Glu
            1540   1545   1550

Glu Tyr Ser Arg Glu His Pro Glu Asp Gln Asp Lys Leu Ser His Leu
            1555   1560   1565

Lys Asp Leu Ile Ala Trp Gln Ile Pro Phe Leu Gly Ala Gly Ile Lys
            1570   1575   1580

Ile His Glu Lys Arg Val Ser Asp Asn Leu Arg Pro Phe His Asp Arg
1585   1590   1595   1600

12／61

Met Glu Glu Cys Phe Lys Asn Leu Lys Met Lys Val Glu Lys Glu Tyr
          1605   1610   1615

Gly Val Arg Glu Met Pro Asp Phe Glu Asp Arg Arg Val Gly Arg Pro
          1620   1625   1630

Arg Ser Met Leu Arg Ser Tyr Arg Gln Met Ser Val Ile Ser Leu Ala
          1635   1640   1645

Ser Met His Ser Asp Cys Ser Thr Pro Ser Lys Val Pro Ala Glu Ser
          1650   1655   1660

Phe Asp Leu Glu Ser Ala Pro Pro Lys Thr Pro Lys Val Glu Glu Glu
1665   1670   1675   1680

Pro Ile Ser Pro Gly Ser Thr Leu Pro Glu Val Lys Leu Arg Arg Ser
          1685   1690   1695

Lys Lys Arg Thr Lys Arg Ser Ser Val Val Phe Ala Asp Glu Lys Ala
          1700   1705   1710

Ala Thr Glu Ser Asp Leu Lys Arg Leu Ser Arg Lys Gln Glu Phe Met
          1715   1720   1725

Ser Asp Thr Asn Leu Ser Glu His Ala Ala Ile Pro Ala Arg Val Ser
          1730   1735   1740

13／61

Ile Leu Ser Gln Met Ser Phe Ala Ser Gln Ser Met Pro Thr Ile Pro
1745   1750   1755   1760

Ala Leu Thr Leu Ser Val Ala Gly Val Pro Gly Leu Asp Glu Ala Asn
                1765   1770   1775

Thr Ser Pro Arg Leu Ser Gln Thr Phe Phe Gln Val Ser Asp Gly Asp
                1780   1785   1790

Lys Lys Thr Leu Lys Lys Lys Lys Val Asn Gln Phe Phe Lys Thr Met
                1795   1800   1805

Leu Ala Ser Lys Ser Ser Glu Glu Ser Lys Gln Ile Pro Asp Phe Leu
    1810   1815   1820

Ser Thr Asn Met
1825

<210> 2
<211> 1830
<212> PRT
<213> Homo sapiens

<400> 2
Met Ala Pro Trp Arg Lys Ala Asp Lys Glu Arg His Gly Val Ala Ile

```
        1                5               10              15

Tyr Asn Phe Gln Gly Ser Gly Ala Pro Gln Leu Ser Leu Gln Ile Gly
           20                25              30

Asp Val Val Arg Ile Gln Glu Thr Cys Gly Asp Trp Tyr Arg Gly Tyr
           35                40              45

Leu Ile Lys His Lys Met Leu Gln Gly Ile Phe Pro Lys Ser Phe Ile
           50                55              60

His Ile Lys Glu Val Thr Val Glu Lys Arg Arg Asn Thr Glu Asn Ile
 65                70                75              80

Ile Pro Ala Glu Ile Pro Leu Ala Gln Glu Val Thr Thr Thr Leu Trp
                85                90              95

Glu Trp Gly Ser Ile Trp Lys Gln Leu Tyr Val Ala Ser Lys Lys Glu
           100               105             110

Arg Phe Leu Gln Val Gln Ser Met Met Tyr Asp Leu Met Glu Trp Arg
           115               120             125

Ser Gln Leu Leu Ser Gly Thr Leu Pro Lys Asp Glu Leu Lys Glu Leu
           130               135             140

Lys Gln Lys Val Thr Ser Lys Ile Asp Tyr Gly Asn Lys Ile Leu Glu
```

Leu Asp Leu Ile Val Arg Asp Glu Asp Gly Asn Ile Leu Asp Pro Asp
                165   170   175

Asn Thr Ser Val Ile Ser Leu Phe His Ala His Glu Glu Ala Thr Asp
                180   185   190

Lys Ile Thr Glu Arg Ile Lys Glu Glu Met Ser Lys Asp Gln Pro Asp
                195   200   205

Tyr Ala Met Tyr Ser Arg Ile Ser Ser Ser Pro Thr His Ser Leu Tyr
        210   215   220

Val Phe Val Arg Asn Phe Val Cys Arg Ile Gly Glu Asp Ala Glu Leu
225   230   235·   240

Phe Met Ser Leu Tyr Asp Pro Asn Lys Gln Thr Val Ile Ser Glu Asn
                245   250   255

Tyr Leu Val Arg Trp Gly Ser Arg Gly Phe Pro Lys Glu Ile Glu Met
                260   265   270

Leu Asn Asn Leu Lys Val Val Phe Thr Asp Leu Gly Asn Lys Asp Leu
                275   280   285

Asn Arg Asp Lys Ile Tyr Leu Ile Cys Gln Ile Val Arg Val Gly Lys

Met Asp Leu Lys Asp Thr Gly Ala Lys Lys Cys Thr Gln Gly Leu Arg
305 310 315 320

Arg Pro Phe Gly Val Ala Val Met Asp Ile Thr Asp Ile Ile Lys Gly
325 330 335

Lys Ala Glu Ser Asp Glu Glu Lys Gln His Phe Ile Pro Phe His Pro
340 345 350

Val Thr Ala Glu Asn Asp Phe Leu His Ser Leu Leu Gly Lys Val Ile
355 360 365

Ala Ser Lys Gly Asp Ser Gly Gly Gln Gly Leu Trp Val Thr Met Lys
370 375 380

Met Leu Val Gly Asp Ile Ile Gln Ile Arg Lys Asp Tyr Pro His Leu
385 390 395 400

Val Asp Arg Thr Thr Val Val Ala Arg Lys Leu Gly Phe Pro Glu Ile
405 410 415

Ile Met Pro Gly Asp Val Arg Asn Asp Ile Tyr Ile Thr Leu Leu Gln
420 425 430

Gly Asp Phe Asp Lys Tyr Asn Lys Thr Thr Gln Arg Asn Val Glu Val

17／61

435   440   445

    Ile Met Cys Val Cys Ala Glu Asp Gly Lys Thr Leu Pro Asn Ala Ile
        450   455   460

    Cys Val Gly Ala Gly Asp Lys Pro Met Asn Glu Tyr Arg Ser Val Val
    465   470   475   480

    Tyr Tyr Gln Val Lys Gln Pro Arg Trp Met Glu Thr Val Lys Val Ala
                    485   490   495

    Val Pro Ile Glu Asp Met Gln Arg Ile His Leu Arg Phe Met Phe Arg
                500   505   510

    His Arg Ser Ser Leu Glu Ser Lys Asp Lys Gly Glu Lys Asn Phe Ala
                515   520   525

    Met Ser Tyr Val Lys Leu Met Lys Glu Asp Gly Thr Thr Leu His Asp
        530   535   540

    Gly Phe His Asp Leu Val Val Leu Lys Gly Asp Ser Lys Lys Met Glu
    545   550   555   560

    Asp Ala Ser Ala Tyr Leu Thr Leu Pro Ser Tyr Arg His His Val Glu
                    565   570   575

    Asn Lys Gly Ala Thr Leu Ser Arg Ser Ser Ser Ser Val Gly Gly Leu

580   585   590

     Ser Val Ser Ser Arg Asp Val Phe Ser Ile Ser Thr Leu Val Cys Ser
              595   600   605

     Thr Lys Leu Thr Gln Asn Val Gly Leu Leu Gly Leu Leu Lys Trp Arg
          610   615   620

     Met Lys Pro Gln Leu Leu Gln Glu Asn Leu Glu Lys Leu Lys Ile Val
     625   630   635   640

     Asp Gly Glu Glu Val Val Lys Phe Leu Gln Asp Thr Leu Asp Ala Leu
                        645   650   655

     Phe Asn Ile Met Met Glu His Ser Gln Ser Asp Glu Tyr Asp Ile Leu
                        660   665   670

     Val Phe Asp Ala Leu Ile Tyr Ile Ile Gly Leu Ile Ala Asp Arg Lys
              675   680   685

     Phe Gln His Phe Asn Thr Val Leu Glu Ala Tyr Ile Gln Gln His Phe
          690   695   700

     Ser Ala Thr Leu Ala Tyr Lys Lys Leu Met Thr Val Leu Lys Thr Tyr
     705   710   715   720

     Leu Asp Thr Ser Ser Arg Gly Glu Gln Cys Glu Pro Ile Leu Arg Thr

                              1 9 ／ 6 1

725   730   735

    Leu Lys Ala Leu Glu Tyr Val Phe Lys Phe Ile Val Arg Ser Arg Thr
                    740   745   750

    Leu Phe Ser Gln Leu Tyr Glu Gly Lys Glu Gln Met Glu Phe Glu Glu
                755   760   765

    Ser Met Arg Arg Leu Phe Glu Ser Ile Asn Asn Leu Met Lys Ser Gln
            770   775   780

    Tyr Lys Thr Thr Ile Leu Leu Gln Val Ala Ala Leu Lys Tyr Ile Pro
    785   790   795   800

    Ser Val Leu His Asp Val Glu Met Val Phe Asp Ala Lys Leu Leu Ser
                        805   810   815

    Gln Leu Leu Tyr Glu Phe Tyr Thr Cys Ile Pro Pro Val Lys Leu Gln
                    820   825   830

    Lys Gln Lys Val Gln Ser Met Asn Glu Ile Val Gln Ser Asn Leu Phe
                835   840   845

    Lys Lys Gln Glu Cys Arg Asp Ile Leu Leu Pro Val Ile Thr Lys Glu
        850   855   860

    Leu Lys Glu Leu Leu Glu Gln Lys Asp Asp Met Gln His Gln Val Leu

Glu Arg Lys Tyr Cys Val Glu Leu Leu Asn Ser Ile Leu Glu Val Leu
885 890 895

Ser Tyr Gln Asp Ala Ala Phe Thr Tyr His His Ile Gln Glu Ile Met
900 905 910

Val Gln Leu Leu Arg Thr Val Asn Arg Thr Val Ile Thr Met Gly Arg
915 920 925

Asp His Ile Leu Ile Ser His Phe Val Ala Cys Met Thr Ala Ile Leu
930 935 940

Asn Gln Met Gly Asp Gln His Tyr Ser Phe Tyr Ile Glu Thr Phe Gln
945 950 955 960

Thr Ser Ser Glu Leu Val Asp Phe Leu Met Glu Thr Phe Ile Met Phe
965 970 975

Lys Asp Leu Ile Gly Lys Asn Val Tyr Pro Gly Asp Trp Met Ala Met
980 985 990

Ser Met Val Gln Asn Arg Val Phe Leu Arg Ala Ile Asn Lys Phe Ala
995 1000 1005

Glu Thr Met Asn Gln Lys Phe Leu Glu His Thr Asn Phe Glu Phe Gln

Leu Trp Asn Asn Tyr Phe His Leu Ala Val Ala Phe Ile Thr Gln Asp
1025   1030   1035   1040

Ser Leu Gln Leu Glu Gln Phe Ser His Ala Lys Tyr Asn Lys Ile Leu
            1045   .   1050   1055

Asn Lys Tyr Gly Asp Met Arg Arg Leu Ile Gly Phe Ser Ile Arg Asp
            1060   1065   1070

Met Trp Tyr Lys Leu Gly Gln Asn Lys Ile Cys Phe Ile Pro Gly Met
            1075   1080   1085

Val Gly Pro Ile Leu Glu Met Thr Leu Ile Pro Glu Ala Glu Leu Arg
    1090   1095   .   1100

Lys Ala Thr Ile Pro Ile Phe Phe Asp Met Met Leu Cys Glu Tyr Gln
1105   1110   1115   1120

Arg Ser Gly Asp Phe Lys Lys Phe Glu Asn Glu Ile Ile Leu Lys Leu
            1125   1130   1135

Asp His Glu Val Glu Gly Gly Arg Gly Asp Glu Gln Tyr Met Gln Leu
            1140   1145   1150

Leu Glu Ser Ile Leu Met Glu Cys Ala Ala Glu His Pro Thr Ile Ala

Lys Ser Val Glu Asn Phe Val Asn Leu Val Lys Gly Leu Leu Glu Lys
    1170   1175   1180

Leu Leu Asp Tyr Arg Gly Val Met Thr Asp Glu Ser Lys Asp Asn Arg
1185   1190   1195   1200

Met Ser Cys Thr Val Asn Leu Leu Asn Phe Tyr Lys Asp Asn Asn Arg
                1205   1210   1215

Glu Glu Met Tyr Ile Arg Tyr Leu Tyr Lys Leu Arg Asp Leu His Leu
                1220   1225   1230

Asp Cys Asp Asn Tyr Thr Glu Ala Ala Tyr Thr Leu Leu Leu His Thr
                1235   1240   1245

Trp Leu Leu Lys Trp Ser Asp Glu Gln Cys Ala Ser Gln Val Met Gln
    1250   1255   1260

Thr Gly Gln Gln His Pro Gln Thr His Arg Gln Leu Lys Glu Thr Leu
1265   1270   1275   1280

Tyr Glu Thr Ile Ile Gly Tyr Phe Asp Lys Gly Lys Met Trp Glu Glu
                1285   1290   1295

Ala Ile Ser Leu Cys Lys Glu Leu Ala Glu Gln Tyr Glu Met Glu Ile

Phe Asp Tyr Glu Leu Leu Ser Gln Asn Leu Ile Gln Gln Ala Lys Phe
        1315   1320   1325

Tyr Glu Ser Ile Met Lys Ile Leu Arg Pro Lys Pro Asp Tyr Phe Ala
        1330   1335   1340

Val Gly Tyr Tyr Gly Gln Gly Phe Pro Ser Phe Leu Arg Asn Lys Val
1345   1350   1355   1360

Phe Ile Tyr Arg Gly Lys Glu Tyr Glu Arg Arg Glu Asp Phe Gln Met
        1365   1370   1375

Gln Leu Met Thr Gln Phe Pro Asn Ala Glu Lys Met Asn Thr Thr Ser
        1380   1385   1390

Ala Pro Gly Asp Asp Val Lys Asn Ala Pro Gly Gln Tyr Ile Gln Cys
        1395   1400   1405

Phe Thr Val Gln Pro Val Leu Asp Glu His Pro Arg Phe Lys Asn Lys
        1410   1415   1420

Pro Val Pro Asp Gln Ile Ile Asn Phe Tyr Lys Ser Asn Tyr Val Gln
1425   1430   1435   1440

Arg Phe His Tyr Ser Arg Pro Val Arg Arg Gly Thr Val Asp Pro Glu

Asn Glu Phe Ala Ser Met Trp Ile Glu Arg Thr Ser Phe Val Thr Ala

1460   1465   1470

Tyr Lys Leu Pro Gly Ile Leu Arg Trp Phe Glu Val Val His Met Ser

1475   1480   1485

Gln Thr Thr Ile Ser Pro Leu Glu Asn Ala Ile Glu Thr Met Ser Thr

1490   1495   1500

Ala Asn Glu Lys Ile Leu Met Met Ile Asn Gln Tyr Gln Ser Asp Glu

1505   1510   1515   1520

Thr Leu Pro Ile Asn Pro Leu Ser Met Leu Leu Asn Gly Ile Val Asp

1525   1530   1535

Pro Ala Val Met Gly Gly Phe Ala Lys Tyr Glu Lys Ala Phe Phe Thr

1540   1545   1550

Glu Glu Tyr Val Arg Asp His Pro Glu Asp Gln Asp Lys Leu Thr His

1555   1560   1565

Leu Lys Asp Leu Ile Ala Trp Gln Ile Pro Phe Leu Gly Ala Gly Ile

1570   1575   1580

Lys Ile His Glu Lys Arg Val Ser Asp Asn Leu Arg Pro Phe His Asp

Arg Met Glu Glu Cys Phe Lys Asn Leu Lys Met Lys Val Glu Lys Glu
          1605   1610   1615

Tyr Gly Val Arg Glu Met Pro Asp Phe Asp Asp Arg Arg Val Gly Arg
          1620   1625   1630

Pro Arg Ser Met Leu Arg Ser Tyr Arg Gln Met Ser Ile Ile Ser Leu
          1635   1640   1645

Ala Ser Met Asn Ser Asp Cys Ser Thr Pro Ser Lys Pro Thr Ser Glu
     1650   1655   1660

Ser Phe Asp Leu Glu Leu Ala Ser Pro Lys Thr Pro Arg Val Glu Gln
1665   1670   1675   1680

Glu Glu Pro Ile Ser Pro Gly Ser Thr Leu Pro Glu Val Lys Leu Arg
               1685   1690   1695

Arg Ser Lys Lys Arg Thr Lys Arg Ser Ser Val Val Phe Ala Asp Glu
               1700   1705   1710

Lys Ala Ala Ala Glu Ser Asp Leu Lys Arg Leu Ser Arg Lys His Glu
          1715   1720   1725

Phe Met Ser Asp Thr Asn Leu Ser Glu His Ala Ala Ile Pro Leu Lys

1730   1735   1740

Ala Ser Val Leu Ser Gln Met Ser Phe Ala Ser Gln Ser Met Pro Thr
1745   1750   1755   1760

Ile Pro Ala Leu Ala Leu Ser Val Ala Gly Ile Pro Gly Leu Asp Glu
                    1765   1770   1775

Ala Asn Thr Ser Pro Arg Leu Ser Gln Thr Phe Leu Gln Leu Ser Asp
                    1780   1785   1790

Gly Asp Lys Lys Thr Leu Thr Arg Lys Lys Val Asn Gln Phe Phe Lys
                    1795   1800   1805

Thr Met Leu Ala Ser Lys Ser Ala Glu Glu Gly Lys Gln Ile Pro Asp
1810   1815   1820

Ser Leu Ser Thr Asp Leu
1825   1830

<210> 3
<211> 727
<212> PRT
<213> Mus musculus

<400> 3

27／61

Met Pro Pro Pro Ser Asp Ile Val Lys Val Ala Ile Glu Trp Pro Gly
1   5   10   15

Ala Tyr Pro Lys Leu Met Glu Ile Asp Gln Lys Lys Pro Leu Ser Ala
          20   25   30

Ile Ile Lys Glu Val Cys Asp Gly Trp Ser Leu Ala Asn His Glu Tyr
          35   40   45

Phe Ala Leu Gln His Ala Asp Ser Ser Asn Phe Tyr Ile Thr Glu Lys
      50   55   60

Asn Arg Asn Glu Ile Lys Asn Gly Thr Ile Leu Arg Leu Thr Thr Ser
65   70   75   80

Pro Ala Gln Asn Ala Gln Gln Leu His Glu Arg Ile Gln Ser Ser Ser
                  85   90   95

Met Asp Ala Lys Leu Glu Ala Leu Lys Asp Leu Ala Ser Leu Ser Arg
              100   105   110

Asp Val Thr Phe Ala Gln Glu Phe Ile Asn Leu Asp Gly Ile Ser Leu
          115   120   125

Leu Thr Gln Met Val Glu Ser Gly Thr Glu Arg Tyr Gln Lys Leu Gln
      130   135   140

28／61

Lys Ile Met Lys Pro Cys Phe Gly Asp Met Leu Ser Phe Thr Leu Thr
145   150   155   160

Ala Phe Val Glu Leu Met Asp His Gly Ile Val Ser Trp Asp Thr Phe
                165   170   175

Ser Val Ala Phe Ile Lys Lys Ile Ala Ser Phe Val Asn Lys Ser Ala
                180   185   190

Ile Asp Ile Ser Ile Leu Gln Arg Ser Leu Ala Ile Leu Glu Ser Met
                195   200   205

Val Leu Asn Ser His Asp Leu Tyr Gln Lys Val Ala Gln Glu Ile Thr
                210   215   220

Ile Gly Gln Leu Ile Pro His Leu Gln Gly Thr Asp Gln Glu Ile Gln
225   230   235   240

Thr Tyr Thr Ile Ala Val Ile Asn Ala Leu Phe Leu Lys Ala Pro Asp
                245   250   255

Glu Arg Arg Gln Glu Met Ala Asn Ile Leu Ala Gln Lys Gln Leu Arg
                260   265   270

Tyr Ile Ile Leu Thr His Val Ile Arg Ala Gln Arg Ala Ile Asn Asn
                275   280   285

29/61

Glu Met Ala His Gln Leu Tyr Val Leu Gln Val Leu Thr Phe Asn Leu
    290   295   300

Leu Glu Asp Arg Met Met Thr Lys Met Asp Pro Gln Asp Gln Ala Gln
305   310   315   320

Arg Asp Ile Ile Phe Glu Leu Arg Arg Ile Ala Phe Asp Ala Glu Ser
            325   330   335

Glu Pro Asn Asn Ser Ser Gly Ser Met Glu Lys Arg Lys Ser Met Tyr
            340   345   350

Thr Arg Asp Tyr Lys Lys Leu Gly Phe Ile Asn His Val Asn Pro Ala
            355   360   365

Met Asp Phe Thr Gln Thr Pro Pro Gly Met Leu Ala Leu Asp Asn Met
    370   375   380

Leu Tyr Phe Ala Lys His His Gln Asp Ala Tyr Ile Arg Ile Val Leu
385   390   395   400

Glu Asn Ser Ser Arg Glu Asp Lys His Glu Cys Pro Phe Gly Arg Ser
            405   410   415

Ser Ile Glu Leu Thr Lys Met Leu Cys Glu Ile Leu Lys Val Gly Glu
            420   425   430

30/61

Leu Pro Ser Glu Thr Cys Asn Asp Phe His Pro Met Phe Phe Thr His
         435   440   445

Asp Arg Ser Phe Glu Glu Phe Phe Cys Ile Cys Ile Gln Leu Leu Asn
         450   455   460

Lys Thr Trp Lys Glu Met Arg Ala Thr Ser Glu Asp Phe Asn Lys Val
465   470   475   480

Met Gln Val Val Lys Glu Gln Val Met Arg Ala Leu Thr Thr Lys Pro
         485   490   495

Ser Ser Leu Asp Gln Phe Lys Ser Lys Leu Gln Asn Leu Ser Tyr Thr
         500   505   510

Glu Ile Leu Lys Ile Arg Gln Ser Glu Arg Met Asn Gln Glu Asp Phe
         515   520   525

Gln Ser Arg Pro Ile Leu Glu Leu Lys Glu Lys Ile Gln Pro Glu Ile
         530   535   540

Leu Glu Leu Ile Lys Gln Gln Arg Leu Asn Arg Leu Val Glu Gly Thr
545   550   555   560

Cys Phe Arg Lys Leu Asn Ala Arg Arg Arg Gln Asp Lys Phe Trp Tyr
         565   570   575

Cys Arg Leu Ser Pro Asn His Lys Val Leu His Tyr Gly Asp Leu Glu
            580   585   590

Glu Ser Pro Gln Gly Glu Val Pro His Asp Ser Leu Gln Asp Lys Leu
            595   600   605

Pro Val Ala Asp Ile Lys Ala Val Val Thr Gly Lys Asp Cys Pro His
            610   615   620

Met Lys Glu Lys Gly Ala Leu Lys Gln Asn Lys Glu Val Leu Glu Leu
625   630   635   640

Ala Phe Ser Ile Leu Tyr Asp Ser Asn Cys Gln Leu Asn Phe Ile Ala
            645   650   655

Pro Asp Lys His Glu Tyr Cys Ile Trp Thr Asp Gly Leu Asn Ala Leu
            660   665   670

Leu Gly Lys Asp Met Met Ser Asp Leu Thr Arg Asn Asp Leu Asp Thr
            675   680   685

Leu Leu Ser Met Glu Ile Lys Leu Arg Leu Leu Asp Leu Glu Asn Ile
            690   695   700

Gln Ile Pro Asp Ala Pro Pro Pro Ile Pro Lys Glu Pro Ser Asn Tyr
705   710   715   720

Asp Phe Val Tyr Asp Cys Asn
                725

<210> 4

<211> 727

<212> PRT

<213> Homo sapiens

<400> 4

Met Pro Pro Pro Ala Asp Ile Val Lys Val Ala Ile Glu Trp Pro Gly
 1   5   10   15

Ala Tyr Pro Lys Leu Met Glu Ile Asp Gln Lys Lys Pro Leu Ser Ala
                20   25   30

Ile Ile Lys Glu Val Cys Asp Gly Trp Ser Leu Ala Asn His Glu Tyr
                35   40   45

Phe Ala Leu Gln His Ala Asp Ser Ser Asn Phe Tyr Ile Thr Glu Lys
                50   55   60

Asn Arg Asn Glu Ile Lys Asn Gly Thr Ile Leu Arg Leu Thr Thr Ser
65   70   75   80

Pro Ala Gln Asn Ala Gln Gln Leu His Glu Arg Ile Gln Ser Ser Ser
                85   90   95

Met Asp Ala Lys Leu Glu Ala Leu Lys Asp Leu Ala Ser Leu Ser Arg
        100   105   110

Asp Val Thr Phe Ala Gln Glu Phe Ile Asn Leu Asp Gly Ile Ser Leu
        115   120   125

Leu Thr Gln Met Val Glu Ser Gly Thr Glu Arg Tyr Gln Lys Leu Gln
        130   135   140

Lys Ile Met Lys Pro Cys Phe Gly Asp Met Leu Ser Phe Thr Leu Thr
145   150   155   160

Ala Phe Val Glu Leu Met Asp His Gly Ile Val Ser Trp Asp Thr Phe
        ·165   170   175

Ser Val Ala Phe Ile Lys Lys Ile Ala Ser Phe Val Asn Lys Ser Ala
        180   185   190

Ile Asp Ile Ser Ile Leu Gln Arg Ser Leu Ala Ile Leu Glu Ser Met
        195   200   205

Val Leu Asn Ser His Asp Leu Tyr Gln Lys Val Ala Gln Glu Ile Thr
        210   215   220

Ile Gly Gln Leu Ile Pro His Leu Gln Gly Ser Asp Gln Glu Ile Gln
225   230   235   240

34／61

Thr Tyr Thr Ile Ala Val Ile Asn Ala Leu Phe Leu Lys Ala Pro Asp
           245   250   255

Glu Arg Arg Gln Glu Met Ala Asn Ile Leu Ala Gln Lys Gln Leu Arg
           260   265   270

Ser Ile Ile Leu Thr His Val Ile Arg Ala Gln Arg Ala Ile Asn Asn
           275   280   285

Glu Met Ala His Gln Leu Tyr Val Leu Gln Val Leu Thr Phe Asn Leu
           290   295   300

Leu Glu Asp Arg Met Met Thr Lys Met Asp Pro Gln Asp Gln Ala Gln
305   310   315   320

Arg Asp Ile Ile Phe Glu Leu Arg Arg Ile Ala Phe Asp Ala Glu Ser
           325   330   335

Glu Pro Asn Asn Ser Ser Gly Ser Met Glu Lys Arg Lys Ser Met Tyr
           340   345   350

Thr Arg Asp Tyr Lys Lys Leu Gly Phe Ile Asn His Val Asn Pro Ala
           355   360   365

Met Asp Phe Thr Gln Thr Pro Pro Gly Met Leu Ala Leu Asp Asn Met
           370   375   380

Leu Tyr Phe Ala Lys His His Gln Asp Ala Tyr Ile Arg Ile Val Leu
385   390   395   400

Glu Asn Ser Ser Arg Glu Asp Lys His Glu Cys Pro Phe Gly Arg Ser
                405   410   415

Ser Ile Glu Leu Thr Lys Met Leu Cys Glu Ile Leu Lys Val Gly Glu
                420   425   430

Leu Pro Ser Glu Thr Cys Asn Asp Phe His Pro Met Phe Phe Thr His
                435   440   445

Asp Arg Ser Phe Glu Glu Phe Phe Cys Ile Cys Ile Gln Leu Leu Asn
                450   455   460

Lys Thr Trp Lys Glu Met Arg Ala Thr Ser Glu Asp Phe Asn Lys Val
465   470   475   480

Met Gln Val Val Lys Glu Gln Val Met Arg Ala Leu Thr Thr Lys Pro
                485   490   495

Ser Ser Leu Asp Gln Phe Lys Ser Lys Leu Gln Asn Leu Ser Tyr Thr
                500   505   510

Glu Ile Leu Lys Ile Arg Gln Ser Glu Arg Met Asn Gln Glu Asp Phe
                515   520   525

Gln Ser Arg Pro Ile Leu Glu Leu Lys Glu Lys Ile Gln Pro Glu Ile
    530   535   540

Leu Glu Leu Ile Lys Gln Gln Arg Leu Asn Arg Leu Val Glu Gly Thr
545   550   555   560

Cys Phe Arg Lys Leu Asn Ala Arg Arg Arg Gln Asp Lys Phe Trp Tyr
                565   570   575

Cys Arg Leu Ser Pro Asn His Lys Val Leu His Tyr Gly Asp Leu Glu
                580   585   590

Glu Ser Pro Gln Gly Glu Val Pro His Asp Ser Leu Gln Asp Lys Leu
                595   600   605

Pro Val Ala Asp Ile Lys Ala Val Val Thr Gly Lys Asp Cys Pro His
    610   615   620

Met Lys Glu Lys Gly Ala Leu Lys Gln Asn Lys Glu Val Leu Glu Leu
625   630   635   640

Ala Phe Ser Ile Leu Tyr Asp Ser Asn Cys Gln Leu Asn Phe Ile Ala
                645   650   655

Pro Asp Lys His Glu Tyr Cys Ile Trp Thr Asp Gly Leu Asn Ala Leu
                660   665   670

Leu Gly Lys Asp Met Met Ser Asp Leu Thr Arg Asn Asp Leu Asp Thr
        675   680   685

Leu Leu Ser Met Glu Ile Lys Leu Arg Leu Leu Asp Leu Glu Asn Ile
        690   695   700

Gln Ile Pro Asp Ala Pro Pro Pro Ile Pro Lys Glu Pro Ser Asn Tyr
705   710   715   720

Asp Phe Val Tyr Asp Cys Asn
                725

<210> 5

<211> 1591

<212> PRT

<213> Mus musculus

<400> 5

Met Gly Asn Ala Glu Ser Gln Asn Val Asp His Glu Phe Tyr Gly Glu
 1   5   10   15

Lys His Ala Ser Leu Gly Arg Lys His Thr Ser Arg Ser Leu Arg Leu
                20   25   30

Ser His Lys Thr Arg Arg Thr Arg His Ala Ser Ser Gly Lys Ala Ile

His Arg Asn Ser Glu Val Ser Thr Arg Ser Ser Ser Thr Pro Ser Ile
        50   55   60

Pro Gln Ser Leu Ala Glu Asn Gly Leu Glu Pro Phe Ser Gln Glu Gly
65   70   75   80

Ala Leu Asp Asp Phe Gly Asp Pro Ile Trp Val Asp Arg Val Asp Met
                85   90   95

Gly Leu Arg Pro Val Ser Tyr Thr Asp Ser Ser Val Thr Pro Ser Val
            100   105   110

Asp Gly Ser Ile Val Leu Thr Ala Ala Ser Val Gln Ser Met Pro Asp
            115   120   125

Ser Glu Glu Ser Arg Leu Tyr Gly Asp Asp Ala Thr Tyr Leu Ala Glu
        130   135   140

Gly Gly Arg Arg Gln Cys Pro Tyr Thr Ser Asn Gly Pro Thr Phe Met
145   150   155   160

Glu Thr Ala Ser Phe Lys Lys Lys Arg Ser Lys Ser Ala Asp Ile Trp
                165   170   175

Arg Glu Asp Ser Leu Glu Phe Ser Leu Ser Asp Leu Ser Gln Glu His

Leu Thr Ser Asn Glu Glu Ile Leu Gly Ser Ala Glu Glu Lys Asp Cys
        195   200   205

Glu Glu Ala Arg Gly Met Glu Thr Glu Ala Ser Pro Arg Gln Leu Ser
        210   215   220

Thr Cys Gln Arg Ala Asn Ser Leu Gly Asp Leu Tyr Ala Gln Lys Asn
225   230   235   240

Ser Gly Val Lys Ala Asn Gly Gly Pro Arg Asn Arg Phe Ser Ser Tyr
                245   250   255

Cys Arg Asn Leu Val Ser Asp Ile Pro Asp Leu Ala Lys His Lys Met
                260   265   270

Pro Pro Ala Ala Ala Glu Glu Thr Pro Pro Tyr Ser Asn Tyr Asn Thr
                275   280   285

Leu Pro Cys Arg Lys Ser His Cys Leu Ser Glu Gly Ala Thr Asn Pro
        290   295   300

Gln Ile Ser Leu Ser Lys Ser Met Gln Gly Arg Arg Ala Lys Thr Thr
305   310   315   320

Gln Asp Val Asn Thr Gly Glu Gly Ser Glu Phe Ala Asp Ser Gly Ile

Glu Gly Ala Thr Thr Asp Thr Asp Leu Leu Ser Arg Arg Ser Asn Ala
    340   345   350

Thr Asn Ser Ser Tyr Ser Pro Pro Thr Gly Arg Ala Phe Val Gly Ser
    355   360   365

Asp Ser Gly Ser Ser Ser Thr Gly Asp Arg Ala Arg Gln Gly Val Tyr
    370   375   380

Glu Asn Phe Arg Arg Glu Leu Glu Met Ser Thr Thr Asn Ser Glu Ser
385   390   395   400

Leu Glu Glu Ala Gly Ser Ala His Ser Asp Glu Gln Ser Ser Gly Thr
     405   410   415

Leu Ser Ser Pro Gly Gln Ser Asp Ile Leu Leu Thr Ala Ala Gln Gly
    420   425   430

Thr Val Arg Lys Ala Gly Ala Leu Ala Val Lys Asn Phe Leu Val His
    435   440   445

Lys Lys Asn Lys Lys Val Glu Ser Ala Thr Arg Arg Lys Trp Lys His
    450   455   460

Tyr Trp Val Ser Leu Lys Gly Cys Thr Leu Phe Phe Tyr Glu Thr Asp

Gly Arg Ser Gly Ile Asp His Asn Ser Val Pro Lys His Ala Val Trp
            485   490   495

Val Glu Asn Ser Ile Val Gln Ala Val Pro Glu His Pro Lys Lys Asp
            500   505   510

Phe Val Phe Cys Leu Ser Asn Ser Leu Gly Asp Ala Phe Leu Phe Gln
            515   520   525

Thr Thr Ser Gln Thr Glu Leu Glu Asn Trp Ile Thr Ala Ile His Ser
            530   535   540

Ala Cys Ala Ala Ala Val Ala Arg His His His Lys Glu Asp Thr Leu
545   550   555   560

Arg Leu Leu Lys Ser Glu Ile Lys Lys Leu Glu Gln Lys Ile Asp Met
            565   570   575

Asp Glu Lys Met Lys Lys Met Gly Glu Met Gln Leu Ser Ser Val Thr
            580   585   590

Asp Ser Lys Lys Lys Lys Thr Ile Leu Asp Gln Ile Phe Val Trp Glu
            595   600   605

Gln Asn Leu Glu Gln Phe Gln Met Asp Leu Phe Arg Phe Arg Cys Tyr

Leu Ala Ser Leu Gln Gly Gly Glu Leu Pro Asn Pro Lys Arg Leu Leu
625   630   635   640

Ala Phe Ala Ser Arg Pro Thr Lys Val Ala Met Gly Arg Leu Gly Ile
                   645   650   655

Phe Ser Val Ser Ser Phe His Ala Leu Val Ala Ala Arg Thr Gly Glu
                   660   665   670

Ile Gly Val Arg Arg Arg Thr Gln Ala Met Ser Arg Ser Ala Ser Lys
                   675   680   685

Arg Arg Ser Arg Phe Ser Ser Leu Trp Gly Leu Asp Thr Thr Ser Lys
                   690   695   700

Lys Lys Gln Gly Arg Pro Thr Ile Asn Gln Val Phe Gly Glu Gly Thr
705   710   715   720

Asp Ala Val Lys Arg Ser Leu Glu Gly Ile Phe Asp Asp Thr Val Pro
                   725   730   735

Asp Gly Lys Arg Glu Lys Glu Val Val Leu Pro Ser Val His Gln His
                   740   745   750

Asn Pro Asp Cys Asp Ile Trp Val His Glu Tyr Phe Thr Pro Ser Trp

```
              755               760               765


  Phe Cys Leu Pro Asn Asn Gln Pro Ala Leu Thr Val Val Arg Pro Gly
     770               775               780


  Asp Thr Ala Arg Asp Thr Leu Glu Leu Ile Cys Lys Thr His Gln Leu
  785               790               795               800


  Asp His Ser Ala His Tyr Leu Arg Leu Lys Phe Leu Met Glu Asn Arg
                 805               810               815


  Val Gln Phe Tyr Ile Pro Gln Pro Glu Glu Asp Ile Tyr Glu Leu Leu
                 820               825               830


  Tyr Lys Glu Ile Glu Ile Cys Pro Lys Val Thr Gln Asn Ile His Ile
                 835               840               845


  Glu Lys Ser Asp Ala Ala Ala Asp Asn Tyr Gly Phe Leu Leu Ser Ser
     850               855               860


  Val Asp Glu Asp Gly Ile Arg Arg Leu Tyr Val Asn Ser Val Lys Glu
  865               870               875               880


  Thr Gly Leu Ala Ser Lys Lys Gly Leu Lys Ala Gly Asp Glu Ile Leu
                 885               890               895


  Glu Ile Asn Asn Arg Ala Ala Gly Thr Leu Asn Ser Ser Met Leu Lys
```

```
                900                    905                    910

     Asp Phe Leu Ser Gln Pro Ser Leu Gly Leu Leu Val Arg Thr Tyr Pro
             915                    920                    925


     Glu Pro Glu Gly Gly Val Glu Leu Leu Glu Asn Pro Pro His Arg Val
             930                    935                    940


     Asp Gly Pro Val Asp Leu Gly Glu Ser Pro Leu Ala Phe Leu Thr Ser
     945                    950                    955                    960


     Asn Pro Gly His Ser Leu Ser Ser Glu Gln Gly Ser Ser Ala Glu Thr
                     965                    970                    975


     Ala Pro Glu Glu Gly Glu Gly Pro Asp Leu Glu Ser Ser Asp Glu Thr
                     980                    985                    990


     Asp His Ser Ser Lys Ser Thr Glu Gln Val Ala Ala Phe Cys Arg Ser
             995                    1000                   1005


     Leu His Glu Met Ser Pro Ser Asp Ser Ser Pro Ser Pro Gln Asp Ala
             1010                   1015                   1020


     Thr Ser Pro Gln Leu Ala Thr Thr Arg Gln Leu Ser Asp Ala Asp Lys
     1025                   1030                   1035                   1040


     Leu Arg Lys Val Ile Cys Glu Leu Leu Glu Thr Glu Arg Thr Tyr Val
```

Lys Asp Leu Asn Cys Leu Met Glu Arg Tyr Leu Lys Pro Leu Gln Lys

         1060   1065   1070

Glu Thr Phe Leu Thr Gln Asp Glu Leu Asp Val Leu Phe Gly Asn Leu

     1075   1080   1085

Thr Glu Met Val Glu Phe Gln Val Glu Phe Leu Lys Thr Leu Glu Asp

   1090   1095   1100

Gly Val Arg Leu Val Pro Asp Leu Glu Lys Leu Glu Lys Val Asp Gln

1105   1110   1115   1120

Phe Lys Lys Val Leu Phe Ser Leu Gly Gly Ser Phe Leu Tyr Tyr Ala

         1125   1130   1135

Asp Arg Phe Lys Leu Tyr Ser Ala Phe Cys Ala Ser His Thr Lys Val

      1140   1145   1150

Pro Lys Val Leu Val Lys Ala Lys Thr Asp Thr Ala Phe Lys Ala Phe

     1155   1160   1165

Leu Asp Ala Gln Asn Pro Arg Gln Gln His Ser Ser Thr Leu Glu Ser

   1170   1175   1180

Tyr Leu Ile Lys Pro Ile Gln Arg Val Leu Lys Tyr Pro Leu Leu Leu

Arg Glu Leu Phe Ala Leu Thr Asp Ala Glu Ser Glu Glu His Tyr His
                1205   1210   1215

Leu Asp Val Ala Ile Lys Thr Met Asn Lys Val Ala Ser His Ile Asn
                1220   1225   1230

Glu Met Gln Lys Ile His Glu Glu Phe Gly Ala Val Phe Asp Gln Leu
                1235   1240   1245

Ile Ala Glu Gln Thr Gly Glu Lys Lys Glu Val Ala Asp Leu Ser Met
                1250   1255   1260

Gly Asp Leu Leu Leu His Thr Ser Val Ile Trp Leu Asn Pro Pro Ala
1265   1270   1275   1280

Ser Leu Gly Lys Trp Lys Lys Glu Pro Glu Leu Ala Ala Phe Val Phe
                1285   1290   1295

Lys Thr Ala Val Val Leu Val Tyr Lys Asp Gly Ser Lys Gln Lys Lys
                1300   1305   1310

Lys Leu Val Gly Ser His Arg Leu Ser Ile Tyr Glu Glu Trp Asp Pro
                1315   1320   1325

Phe Arg Phe Arg His Met Ile Pro Thr Glu Ala Leu Gln Val Arg Ala

Leu Pro Ser Ala Asp Ala Glu Ala Asn Ala Val Cys Glu Ile Val His
1345   1350   1355   1360

Val Lys Ser Glu Ser Glu Gly Arg Pro Glu Arg Val Phe His Leu Cys
                    1365   1370   1375

Cys Ser Ser Pro Glu Ser Arg Lys Asp Phe Leu Lys Ser Val His Ser
                    1380   1385   1390

Ile Leu Arg Asp Lys His Arg Arg Gln Leu Leu Lys Thr Glu Ser Leu
                    1395   1400   1405

Pro Ser Ala Gln Gln Tyr Val Pro Phe Gly Gly Lys Arg Leu Cys Ala
                    1410   1415   1420

Leu Lys Gly Ala Arg Pro Ala Met Ser Arg Ala Val Ser Ala Pro Ser
1425   1430   1435   1440

Lys Ser Leu Gly Arg Arg Arg Arg Arg Leu Ala Arg Asn Arg Phe Thr
                    1445   1450   1455

Ile Asp Ser Asp Ala Ile Ser Ala Ser Ser Pro Glu Lys Glu Pro Gln
                    1460   1465   1470

Gln Pro Ala Gly Gly Gly Asp Thr Asp Arg Trp Val Glu Glu.Gln Phe

1475   1480   1485

Asp Leu Ala Gln Tyr Glu Glu Gln Asp Asp Ile Lys Glu Thr Asp Ile
        1490   1495   1500

Leu Ser Asp Asp Asp Glu Phe Cys Glu Ser Leu Lys Gly Ala Ser Val
1505   1510   1515   1520

Asp Arg Asp Leu Gln Glu Gln Leu Gln Ala Ala Ser Ile Ser Gln Arg
                1525   1530   1535

Ala Arg Gly Arg Arg Thr Leu Asp Ser His Ala Ser Arg Met Thr Gln
                1540   1545   1550

Leu Lys Lys Gln Ala Ala Leu Ser Gly Ile Asn Gly Gly Leu Glu Ser
        1555   1560   1565

Ala Ser Glu Glu Val Ile Trp Val Arg Arg Glu Asp Phe Ala Pro Ser
1570   1575   1580

Arg Lys Leu Asn Thr Glu Ile
1585   1590

<210> 6
<211> 1591
<212> PRT

<213> Homo sapiens

<400> 6

Met Gly Asn Ala Glu Ser Gln His Val Glu His Glu Phe Tyr Gly Glu
1   5   10   15

Lys His Ala Ser Leu Gly Arg Asn Asp Thr Ser Arg Ser Leu Arg Leu
            20   25   30

Ser His Lys Thr Arg Arg Thr Arg His Ala Ser Ser Gly Lys Val Ile
            35   40   45

His Arg Asn Ser Glu Val Ser Thr Arg Ser Ser Ser Thr Pro Ser Ile
        50   55   60

Pro Gln Ser Leu Ala Glu Asn Gly Leu Glu Pro Phe Ser Gln Asp Gly
65   70   75   80

Thr Leu Glu Asp Phe Gly Ser Pro Ile Trp Val Asp Arg Val Asp Met
                85   90   95

Gly Leu Arg Pro Val Ser Tyr Thr Asp Ser Ser Val Thr Pro Ser Val
                100   105   110

Asp Ser Ser Ile Val Leu Thr Ala Ala Ser Val Gln Ser Met Pro Asp
            115   120   125

50／61

Thr Glu Glu Ser Arg Leu Tyr Gly Asp Asp Ala Thr Tyr Leu Ala Glu
    130   135   140

Gly Gly Arg Arg Gln His Ser Tyr Thr Ser Asn Gly Pro Thr Phe Met
145   150   155   160

Glu Thr Ala Ser Phe Lys Lys Lys Arg Ser Lys Ser Ala Asp Ile Trp
            165   170   175

Arg Glu Asp Ser Leu Glu Phe Ser Leu Ser Asp Leu Ser Gln Glu His
            180   185   190

Leu Thr Ser Asn Glu Glu Ile Leu Gly Ser Ala Glu Glu Lys Asp Cys
            195   200   205

Glu Glu Ala Arg Gly Met Glu Thr Arg Ala Ser Pro Arg Gln Leu Ser
    210   215   220

Thr Cys Gln Arg Ala Asn Ser Leu Gly Asp Leu Tyr Ala Gln Lys Asn
225   230   235   240

Ser Gly Val Thr Ala Asn Met Gly Pro Gly Ser Lys Phe Ala Gly Tyr
            245   250   255

Cys Arg Asn Leu Val Ser Asp Ile Pro Asn Leu Ala Asn His Lys Met
            260   265   270

Pro Pro Ala Ala Ala Glu Glu Thr Pro Pro Tyr Ser Asn Tyr Asn Thr
          275   280   285

Leu Pro Cys Arg Lys Ser His Cys Leu Ser Glu Gly Ala Thr Asn Pro
     290   295   300

Gln Ile Ser His Ser Asn Ser Met Gln Gly Arg Arg Ala Lys Thr Thr
305   310   315   320

Gln Asp Val Asn Ala Gly Glu Gly Ser Glu Phe Ala Asp Ser Gly Ile
               325   330   335

Glu Gly Ala Thr Thr Asp Thr Asp Leu Leu Ser Arg Arg Ser Asn Ala
               340   345   350

Thr Asn Ser Ser Tyr Ser Pro Thr Thr Gly Arg Ala Phe Val Gly Ser
          355   360   365

Asp Ser Gly Ser Ser Ser Thr Gly Asp Ala Ala Arg Gln Gly Val Tyr
     370   375   380

Glu Asn Phe Arg Arg Glu Leu Glu Met Ser Thr Thr Asn Ser Glu Ser
385   390   395   400

Leu Glu Glu Ala Gly Ser Ala His Ser Asp Glu Gln Ser Ser Gly Thr
               405   410   415

Leu Ser Ser Pro Gly Gln Ser Asp Ile Leu Leu Thr Ala Ala Gln Gly
              420   425   430

Thr Val Arg Lys Ala Gly Ala Leu Ala Val Lys Asn Phe Leu Val His
          435   440   445

Lys Lys Asn Lys Lys Val Glu Ser Ala Thr Arg Arg Lys Trp Lys His
          450   455   460

Tyr Trp Val Ser Leu Lys Gly Cys Thr Leu Phe Phe Tyr Glu Ser Asp
465   470   475   480

Gly Arg Ser Gly Ile Asp His Asn Ser Ile Pro Lys His Ala Val Trp
              485   490   495

Val Glu Asn Ser Ile Val Gln Ala Val Pro Glu His Pro Lys Lys Asp
          500   505   510

Phe Val Phe Cys Leu Ser Asn Ser Leu Gly Asp Ala Phe Leu Phe Gln
          515   520   525

Thr Thr Ser Gln Thr Glu Leu Glu Asn Trp Ile Thr Ala Ile His Ser
          530   535   540

Ala Cys Ala Thr Ala Val Ala Arg His His His Lys Glu Asp Thr Leu
545   550   555   560

Arg Leu Leu Lys Ser Glu Ile Lys Lys Leu Glu Gln Lys Ile Asp Met
565   570   575

Asp Glu Lys Met Lys Lys Met Gly Glu Met Gln Leu Ser Ser Val Thr
580   585   590

Asp Ser Lys Lys Lys Lys Thr Ile Leu Asp Gln Ile Phe Val Trp Glu
595   600   605

Gln Asn Leu Glu Gln Phe Gln Met Asp Leu Phe Arg Phe Arg Cys Tyr
610   615   620

Leu Ala Ser Leu Gln Gly Gly Glu Leu Pro Asn Pro Lys Arg Leu Leu
625   630   635   640

Ala Phe Ala Ser Arg Pro Thr Lys Val Ala Met Gly Arg Leu Gly Ile
645   650   655

Phe Ser Val Ser Ser Phe His Ala Leu Val Ala Ala Arg Thr Gly Glu
660   665   670

Thr Gly Val Arg Arg Arg Thr Gln Ala Met Ser Arg Ser Ala Ser Lys
675   680   685

Arg Arg Ser Arg Phe Ser Ser Leu Trp Gly Leu Asp Thr Thr Ser Lys
690   695   700

Lys Lys Gln Gly Arg Pro Ser Ile Asn Gln Val Phe Gly Glu Gly Thr
705   710   715   720

Glu Ala Val Lys Lys Ser Leu Glu Gly Ile Phe Asp Asp Ile Val Pro
                725   730   735

Asp Gly Lys Arg Glu Lys Glu Val Val Leu Pro Asn Val His Gln His
                740   745   750

Asn Pro Asp Cys Asp Ile Trp Val His Glu Tyr Phe Thr Pro Ser Trp
                755   760   765

Phe Cys Leu Pro Asn Asn Gln Pro Ala Leu Thr Val Val Arg Pro Gly
                770   775   780

Asp Thr Ala Arg Asp Thr Leu Glu Leu Ile Cys Lys Thr His Gln Leu
785   790   795   800

Asp His Ser Ala His Tyr Leu Arg Leu Lys Phe Leu Ile Glu Asn Lys
                805   810   815

Met Gln Leu Tyr Val Pro Gln Pro Glu Glu Asp Ile Tyr Glu Leu Leu
                820   825   830

Tyr Lys Glu Ile Glu Ile Cys Pro Lys Val Thr His Ser Ile His Ile
                835   840   845

Glu Lys Ser Asp Thr Ala Ala Asp Thr Tyr Gly Phe Ser Leu Ser Ser
       850   855   860

Val Glu Glu Asp Gly Ile Arg Arg Leu Tyr Val Asn Ser Val Lys Glu
865   870   875   880

Thr Gly Leu Ala Ser Lys Lys Gly Leu Lys Ala Gly Asp Glu Ile Leu
             885   890   895

Glu Ile Asn Asn Arg Ala Ala Asp Ala Leu Asn Ser Ser Met Leu Lys
             900   905   910

Asp Phe Leu Ser Gln Pro Ser Leu Gly Leu Leu Val Arg Thr Tyr Pro
       915   920   925

Glu Leu Glu Glu Gly Val Glu Leu Leu Glu Ser Pro Pro His Arg Val
       930   935   940

Asp Gly Pro Ala Asp Leu Asp Glu Ser Pro Leu Ala Phe Leu Thr Ser
945   950   955   960

Asn Pro Gly His Ser Leu Cys Ser Glu Gln Gly Ser Ser Ala Glu Thr
             965   970   975

Ala Pro Glu Glu Thr Glu Gly Pro Asp Leu Glu Ser Ser Asp Glu Thr
             980   985   990

Asp His Ser Ser Lys Ser Thr Glu Gln Val Ala Ala Phe Cys Arg Ser
    995   1000   1005

Leu His Glu Met Asn Pro Ser Asp Gln Asn Pro Ser Pro Gln Asp Ser
   1010   1015   1020

Thr Gly Pro Gln Leu Ala Thr Met Arg Gln Leu Ser Asp Ala Asp Asn
1025   1030   1035   1040

Val Arg Lys Val Ile Cys Glu Leu Leu Glu Thr Glu Arg Thr Tyr Val
              1045   1050   1055

Lys Asp Leu Asn Cys Leu Met Glu Arg Tyr Leu Lys Pro Leu Gln Lys
             1060   1065   1070

Glu Thr Phe Leu Thr Gln Asp Glu Leu Asp Val Leu Phe Gly Asn Leu
             1075   1080   1085

Thr Glu Met Val Glu Phe Gln Val Glu Phe Leu Lys Thr Leu Glu Asp
1090   1095   1100

Gly Val Arg Leu Val Pro Asp Leu Glu Lys Leu Glu Lys Val Asp Gln
1105   1110   1115   1120

Phe Lys Lys Val Leu Phe Ser Leu Gly Gly Ser Phe Leu Tyr Tyr Ala
             1125   1130   1135

Asp Arg Phe Lys Leu Tyr Ser Ala Phe Cys Ala Ile His Thr Lys Val
          1140   1145   1150

Pro Lys Val Leu Val Lys Ala Lys Thr Asp Thr Ala Phe Lys Ala Phe
          1155   1160   1165

Leu Asp Ala Gln Asn Pro Lys Gln Gln His Ser Ser Thr Leu Glu Ser
          1170   1175   1180

Tyr Leu Ile Lys Pro Ile Gln Arg Ile Leu Lys Tyr Pro Leu Leu Leu
     1185   1190   1195   1200

Arg Glu Leu Phe Ala Leu Thr Asp Ala Glu Ser Glu Glu His Tyr His
               1205   1210   1215

Leu Asp Val Ala Ile Lys Thr Met Asn Lys Val Ala Ser His Ile Asn
          1220   1225   1230

Glu Met Gln Lys Ile His Glu Glu Phe Gly Ala Val Phe Asp Gln Leu
          1235   1240   1245

Ile Ala Glu Gln Thr Gly Glu Lys Lys Glu Val Ala Asp Leu Ser Met
     1250   1255   1260

Gly Asp Leu Leu Leu His Thr Thr Val Ile Trp Leu Asn Pro Pro Ala
     1265   1270   1275   1280

58／61

Ser Leu Gly Lys Trp Lys Lys Glu Pro Glu Leu Ala Ala Phe Val Phe
                1285   1290   1295

Lys Thr Ala Val Val Leu Val Tyr Lys Asp Gly Ser Lys Gln Lys Lys
            1300   1305   1310

Lys Leu Val Gly Ser His Arg Leu Ser Ile Tyr Glu Asp Trp Asp Pro
            1315   1320   1325

Phe Arg Phe Arg His Met Ile Pro Thr Glu Ala Leu Gln Val Arg Ala
            1330   1335   1340

Leu Ala Ser Ala Asp Ala Glu Ala Asn Ala Val Cys Glu Ile Val His
    1345   1350   1355   1360

Val Lys Ser Glu Ser Glu Gly Arg Pro Glu Arg Val Phe His Leu Cys
                1365   1370   1375

Cys Ser Ser Pro Glu Ser Arg Lys Asp Phe Leu Lys Ala Val His Ser
            1380   1385   1390

Ile Leu Arg Asp Lys His Arg Arg Gln Leu Leu Lys Thr Glu Ser Leu
            1395   1400   1405

Pro Ser Ser Gln Gln Tyr Val Pro Phe Gly Gly Lys Arg Leu Cys Ala
    1410   1415   1420

Leu Lys Gly Ala Arg Pro Ala Met Ser Arg Ala Val Ser Ala Pro Ser
1425   1430   1435   1440

Lys Ser Leu Gly Arg Arg Arg Arg Arg Leu Ala Arg Asn Arg Phe Thr
             1445   1450   1455

Ile Asp Ser Asp Ala Val Ser Ala Ser Ser Pro Glu Lys Glu Ser Gln
         1460   1465   1470

Gln Pro Pro Gly Gly Gly Asp Thr Asp Arg Trp Val Glu Glu Gln Phe
         1475   1480   1485

Asp Leu Ala Gln Tyr Glu Glu Gln Asp Asp Ile Lys Glu Thr Asp Ile
         1490   1495   1500

Leu Ser Asp Asp Asp Glu Phe Cys Glu Ser Val Lys Gly Ala Ser Val
1505   1510   1515   1520

Asp Arg Asp Leu Gln Glu Arg Leu Gln Ala Thr Ser Ile Ser Gln Arg
             1525   1530   1535

Glu Arg Gly Arg Lys Thr Leu Asp Ser His Ala Ser Arg Met Ala Gln
             1540   1545   1550

Leu Lys Lys Gln Ala Ala Leu Ser Gly Ile Asn Gly Gly Leu Glu Ser
         1555   1560   1565

60／61

Ala Ser Glu Glu Val Ile Trp Val Arg Arg Glu Asp Phe Ala Pro Ser
        1570   1575   1580

Arg Lys Leu Asn Thr Glu Ile
1585   1590

<210> 7
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:HA-tag

<400> 7
Tyr Pro Tyr Asp Val Pro Asp Tyr Ala
    1   5